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ABSTRACT

This practicum was designed to heighten preschool teachers' awareness of gender bias in the classroom and provide information on gender equity issues and the pursuit of the study of mathematics by girls. Its goal was to enable 20 preschool teachers in 3 preschool programs to increase their knowledge of gender equity and to use this knowledge in the classroom. Three workshops were presented to three separate groups of teachers that included experiential exercises on defining gender bias, making changes, and exclusion. Through pre- and post-tests and workshop evaluations, it was found that preschool teachers who participated changed their attitudes and demonstrated heightened awareness of gender-biased behavior in the classroom. Ten appendixes provide copies of teacher and counselor surveys, pre- and post-test questionnaires, workshop agendas and outlines, activity outlines, follow-up workshop outlines, and workshop evaluations. Contains 61 references. (MDM)

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ED 367 490

Utilization of Teacher Workshops to Enhance Early Exposure to Gender Equity and Mathematics Education for Young Girls in Preschool Settings.

by

Fran Orenstein

Cluster XLIV

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A Practicum II Report presented to the Ed.D. Program in Child and Youth Studies in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

NOVA UNIVERSITY

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ABSTRACT

Utilization of Teacher Workshops to Enhance Early Exposure of Girls in Preschool to Gender Equity and Mathematics Education. Orenstein, Fran M., 1993: Practicum Report, Nova University, Ed.D. Program in Child and Youth Studies. Gender equity/preschool/ mathematics/early childhood education/child care/ educational equity/gender bias/self-esteem.

The intent of this practicum was to heighten preschool teachers' awareness of gender bias in the classroom and provide information on gender equity issues and the pursuit of the study of mathematics by girls. Workshops were presented to preschool teachers to enhance behaviorial changes in their treatment of girls in the classroom and to provide activities that would encourage female students' pursuit of mathematics at a later date.

Three workshops were presented to three separate groups of preschool teachers that included experiential exercises on defining gender bias, making changes, and exclusion. A discussion of the issues presented in current literature occurred as the result of processing the answers to a short pre- and post-test. A descriptive list of activities was presented to participants for inclusion in the curriculum over a three month period as well as a list of books that did not contain gender bias, or were related to non-traditional careers and mathematics-related careers.

The results of the practicum showed that the preschool teachers who participated changed their attitudes and demonstrated heightened awareness of gender-biased behavior in the classroom. They also exhibited a solid understanding of the issues and enthusiasm for implementing activities that encouraged gender equity and pursuit of mathematics-related studies and careers. The directors of the programs were very pleased with the workshops and the resulting changes in behavior and attitude.

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CHAPTER I

INTRODUCTION

Description of Community

The writer's work place is a small state agency on the division level, whose mission is to improve the lives of women throughout the state. Since the work setting encompassed the entire state, the writer had chosen for three preschools in urban and suburban areas in the central part of the state. The urban location is an inner-city school situated in the State Capitol. The population is primarily minority on the lower end of the economic scale. However, this school is private and therefore attracts families who are able to support the high cost of tuition. The suburban schools are located in affluent, middle-class communities, that are primarily white, with minority groups sprinkled in the different suburban developments of houses, townhouses, and condominiums. Since these schools are expensive, the students come from families with two incomes, who are mostly college-educated professionals.

Writers' Work Setting and Role

The writer is a program development specialist who develops, designs, and implements new programs to fulfill the mission of the division and manages existing programs within her purview, specifically in the area of child care and early childhood education. The writer provides technical assistance through information dissemination to the public. She interacts with statewide organizations and other public agencies in an advisory capacity.

Additionally, the writer initiates programs to benefit 2500 licensed child care centers, 4000 family day care providers and 850 school-age child care programs. This involvement may include technical assistance, training, and advocacy. The writer sits on a number of councils and committees that advocate for children and belongs to local and national organizations that deal with aspects of child care and the needs of children. Part of the scope of the writer's job is to provide technical assistance to employers about work and family initiatives through a volunteer task force and an employer-supported child care team that consists of state agency representatives and community volunteers.

The writer also created a program on women and disabilities and manages a volunteer statewide coalition that addresses this issue. Finally, the writer is part of a program on the prevention of violence against women, dealing with gender bias, psychological violence, and equity issues.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

Many adolescent girls do not choose to study higher mathematics or to pursue related careers, instead they study courses considered appropriate for women by society, thereby avoiding scientific, technical, and mathematical coursework. Girls also pursue careers deemed proper for women by society, and do not follow career paths that may be considered non-traditional. As a result of this lack of mathematical background and training, these girls will be denied access to technological careers, management positions, and equal pay for equal work when they reach womanhood and enter the job market. Preschool girls today will be competing in the highly technical world of the information and computer age of the twenty-first century, therefore reversal of the situation that arises in adolescence must be addressed at an early age.

Problem Documentation

Evidence of this problem was supported by interviews (see Appendix A for survey). The writer interviewed guidance counselors at the high school level who reported that a very small number of female students study higher mathematics or enter related career paths (Table I).

Table 1

Survey of High School Guidance Counselors on The Participation of Girls in Higher Mathematics Classes.

Description of Students	Description of Schools			
	Rural	Suburban	Urban Ethnic and economic heterogeneity	Urban Ethnic and economic homogeneity
Number of students in group.	250	300	400	457
Number of female students in group.	100	140	100	120
Number of girls studying higher mathematics.	3	30	30	80

The writer interviewed mathematics teachers who also reported low numbers of girls in their advanced math classes (Table 2).

Table 2

Survey of High School Mathematics Teachers on the Participation of Girls in Higher Mathematics Courses.

Description of Students	Description of Schools	
	Suburban Middle income, ethnic heterogeneity	Urban Low income ethnic homogeneity
Number of students in group.	300	480
Number of female Students in group.	160	210
Number of girls studying higher mathematics.	8	7

A teacher in a suburban New Jersey high school who supervises a Math League comprised of ten advanced mathematics students reported that there is one girl in the program this year. Furthermore, this same teacher stated that in this top group, the boys tested in the top 95% on the state achievement exam; there were no girls in that percentile.

A mathematics teacher in a large New York City urban high school stated that girls are placed in academic tracks that are not mathematics oriented.

Evidence of this problem was supported by conferences and meetings. The 10th annual Celebration of Our Work conference at the major state university May 19, 1992

devoted two workshops to exploring the issues surrounding gender equity in mathematics.

The 1990 meeting of the Consortium for Educational Equity discussed the efforts they have made to resolve the gender equity problem in the classroom, particularly in mathematics education.

The Education Subcommittee of the Governor's Committee on Children's Services Planning included the problem of gender equity in the classroom as a possible issue to explore next year.

The Child Care Advisory Council discussed the role of the preschool teacher in promoting early equity in the classroom (1990, May).

Causative Analysis

The writer believed that there are 7 causes for the stated problem. Attitudinal biases exist among educators toward girls and mathematics. Mathematics teachers show preference for boys over girls in the classroom. They behave differently toward girls and boys in response to questions and answers. Educators have stereotyped ideas about the role girls play in society. They believe negative myths about girls' ability in mathematics. Educators do not encourage girls to excel in mathematics. There are too few female role models or mentors for girls in mathematics.

Relationship of the Problem to the Literature

A review of the literature revealed that most adolescent girls do not study higher mathematics or pursue related careers. The preliminary literature review showed that Fennema (1982, 1990), Fennema & Sherman (1977), Fox (1981), and Gardner (1986) all supported the fact that American girls are poorly represented in mathematics courses, giving a variety of reasons for this phenomenon.

Other literature supported the problem that most girls do not study higher mathematics. A number of newspaper articles supported the issue of low representation of girls in higher mathematics courses. The Christian Science Monitor (1986, October 23) discussed the reasons why girls do not continue to study mathematics. The Los Angeles Times (1987, September 10) reported on the inequity of treatment that girls receive in the classroom, which leads to loss of self-esteem. The Star-Ledger (1992, February 12) published the results of a study that found that schools favor boys over girls in classroom interaction. The New York Times (1992, February 12) cited the results of the A.A.U.W. report on bias against girls in schools. The Chatham Courier (1981, January 29) cited the discrepancy in the interaction with two preschool children, a girl and a boy. The Star-Ledger (1992, week of April 27) published a Doonesbury comic strip depicting the problems of a young girl in gaining the attention of the teacher during her mathematics lesson and the parents' concern about equal education. A Peanuts cartoon in the Palm Beach Post (1992, April 8) showed

Charlie Brown reading about "evidence that girls are not receiving the same quality of education as their brothers".

Literature reflected the low representation of girls in higher mathematics courses. Gardner (1986) stated that although the number of girls taking higher mathematics courses has increased over the past decade, a significant number of girls are avoiding these courses. Fennema (1984) suggested that girls are not reaching their full potential because they are under-represented in mathematics courses.

Wilson & Boldizar (1990) proposed that boys take more advanced mathematics courses than girls beginning in Junior High School. The American Association of University Women (AAUW, 1990), Campbell (1986), Leder (1991), Mook & Iegg (undated), Shaffer & Mahrer (1990), and Syron (1987), also believed that females study less math than their male counterparts.

Literature addressed teacher attitudes as causes of this problem. Teachers believe in the stereotype that girls are poor math students and are not interested in the subject (Fennema, 1990; Kreinburg, 1976). Lockheed (1984) suggested that teachers believe that boys are more important in the classroom. Teachers as members of society believe that mathematics is not a feminine pursuit (Ernest (1980). Fennema (1984) and Luchins & Luchins (1980) thought that teachers do not take girls seriously in regards to mathematics study and perpetuate the myth that girls will eventually get married and not need a career. The Alaska State Department of Education (1987), Gardner (1986) and

Leder (1991) expanded this further to include the subtle messages that teachers send to girls that mathematics is not relevant or appropriate for them. The AAUW (1990) reported that teachers have different expectations of girls and therefore send subtle and not-so-subtle messages that discourage them from pursuing the study of higher mathematics. Cheek (1984), Meyer & Koehler (1990), and Skypeck (1980) also suggested that female students are not imbued with the perception that mathematics is useful in their future.

There was widespread belief that boys are genetically predisposed to succeed in mathematics because of better spatial visual ability (Abel, 1983; Kenschaft, 1990). Although still widely promulgated, this theory was refuted by Abel (1983), Campbell (1986), Fennema (1990), and Fox (1980) as not upheld by evidence.

Cheek (1984), Kirschner (1981), Koehler (1990), Meyer & Koehler (1990), iterated that teachers believe that mathematics is a male domain. Moody & Linn (1986) stated that in the classroom, boys are "valued for thinking logically, independently, with self-confidence, and an appropriate degree of risk-taking, [while] girls are valued for their emotional expressiveness, sensitivity to others, dependency, and subjective thinking" (p, 4). Teachers regard girls as neat, nice, well-behaved, and unquestioning of authority, while boys are considered curious, challenging, aggressive, ambitious and challenging of authority (AAUW, 1990).

Literature acknowledged teacher behavior as a cause of this problem. Lockheed (1984) suggested that teachers treat boys differently by asking questions that are more abstract, product and process oriented than those posed to girls. AAUW (1990), Campbell (1986), Fennema (1990), Kenschaft (1990), Leder (1991), Lockheed (1984), and Luchins & Luchins (1980) asserted that teachers have more interaction with males than females and respond more frequently and differently to their questions. Bridgman (1984) reported subtle behavior on the part of teachers in providing less attention to girls. Teachers are more critical of girls and respond less readily to their requests for assistance (Fennema, 1990). Fox (1990), Leder (1991), and Lockheed (1984) also asserted that teachers find boys' answers to questions more interesting and therefore give more praise and encouragement to boys.

Luchins & Luchins (1980) cited a study of members of the Association for Women in Mathematics in which more than half the women reported discouragement from teachers and advisors. Abel (1983) also supported the discouragement women receive from school personnel regarding mathematics-related careers. Campbell (1986) implied that teachers personally work with boys on their math problems, while assigning other students to work with the girls. The AAUW (1990) reported that teachers will solve the problem if a girl responds with the wrong answer, but will encourage a boy to solve it himself. Thus girls are not encouraged to be independent and autonomous learners of mathematics

(Cheek, 1984).

The Alaska State Department of Education (1987), Fauth & Jacobs (1980), Fox (1981), Hearne (1986), Kreinburg (1976), and Syron (1987) all referred to the lack of female role models in the area of mathematics and math-related careers, particularly teaching.

Mook & Iegg (undated) suggested that girls with mathophobia are not encouraged to overcome this problem, while boys are told to stick it out because math will be important in their futures.

Literature addressed the impact of these attitudes and behaviors on girls and perpetuation of the problem. Cronin (1989) believed that when girls buy into society's myths they come to accept that they are incapable and avoid risk-taking. Koehler (1990) suggested that girls will not try harder to succeed in mathematics if they perceive that these efforts are not valued or appropriate. The author further iterated that girls also act on the congruency of mathematics to their perceived sex-role identity. Girls also incorporate perceptions of the necessity and value of mathematics to their future lives, often accepting negative messages about careers (Fox, 1980).

Meyer & Koehler (1990) believed that favoritism toward males in mathematics classes implies confidence in the male gender which girls accept as true. The AAUW (1990) suggested that girls in the early grades like mathematics, but after adolescence they internalize the difficulty of mathematics as a personal failure, while boys externalize it

as not important. Fennema (1984) and Luchins & Luchins (1980) related confidence to self-esteem which enables students to accept their ability to learn and perform well in mathematics. Fox (1981) went one step further in suggesting that less self-confidence also combines with the perception that mathematics is too difficult. In their 1990 study of 3,000 girls, the AAUW found that up to adolescence, girls were confident and had good self-esteem regarding their abilities to perform well academically and succeed in future career aspirations. However by high school, only 29 percent of the girls compared to 46 percent of the boys were confident and exhibited good self-esteem. The study further stated that low self-esteem leads to low-self confidence, which leads to low aspirations for future success.

Fennema & Sherman (1977) put forth what they considered "two strong forces...lacking high achievement motivation and seeing no relevancy of math to [one's] future life" (p. 371) as factors that would discourage girls from pursuing higher mathematics. Leder (1990) proposed that a belief in mathematics as a male domain can lower confidence and create anxiety or ambivalence toward the appropriateness of studying mathematics.

Literature addressed the impact of the problem on the future of girls in society. McCune (1986) suggested that "our nation cannot tolerate the waste of human potential" (p. 63). In order to participate fully in "tomorrow's society", the study of mathematics and its accompanying

skills will be essential (Fauth & Jacobs, 1980, p. 489). Tobin & Fox (1980) indicated that knowledge of mathematics will be a prerequisite for careers that before the technological advances of the second half of this century did not require such a background. They further asserted that girls who do not continue in mathematics will limit their potential for future career options. Fox (1981) expounded on the idea that "in our modern technological society, an understanding and appreciation of mathematics is becoming more and more important in almost every aspect of human endeavor" (p. 34). She also felt that it is imperative to have a grounding in mathematics if women are to compete on an equal level with men. The Conference Board of the Mathematical Sciences, National Advisory Committee on Mathematical Education (1975) agreed then that mathematics "is a national resource, a national concern and...a national issue" (p. 146).

According to Kreinburg (1976), "women must gain equal access to the resource of mathematical competence" (p. 6). The National Science Board Commission on Pre-College Education in Mathematics, Science, and Technology (1983) further argued that a grounding in mathematics should be available to all students who are "the most important asset of our country" (p. v). The Commission also considered mathematical skills as "a fundamental prerequisite to successful living in the coming century" (p. 9). The AAUW (1990) indicated that by the next century this country will need over 700,000 new scientists and engineers and will also

need three times the number of women in these fields. They further suggested that those girls, now in the sixth grade, will represent 47 percent of the workforce and will be tomorrow's leaders in science, technology, and government.

Literature viewed the problem as it relates to preschool. According to Sheldon (1990) and Westbrook (1980), early childhood teachers do not pay attention to the illustrations and text in books which are biased and stereotyped. Sheldon additionally stated that young children are exposed on a regular basis to sexist language and constant use of 'he' as a pronoun. Girls show more "caregiver behavior" because they receive different messages and are spoken to in language that reflects more emotion and feeling (Shapiro, 1990, pp. 61-62). Shapiro further suggested that the toys that preschool children play with are dependent upon the choices made by significant adults as gender appropriate.

Finally it has been noted that teachers of young children praise girls for "appearance, cooperation, and obedience" and boys for "achievement" (Derman-Sparks & The A.B.C. Task Force, 1989 p. 3).

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Goals and Expectations

The goal of this practicum was to enable 20 teachers in three separate preschool programs to increase their knowledge of gender equity and utilize this knowledge in the classroom.

The following outcomes were projected for this practicum.

Expected Outcomes

1. One half of the 20 preschool teachers who participate would have increased knowledge of gender-appropriate language.

2. One half of the 20 preschool teachers who participate would have increased knowledge of gender-appropriate techniques for teaching.

3. One half of the 20 preschool teachers who participate would have increased knowledge of activities that enhance the confidence of girls.

4. One half of the 20 preschool teachers who participate would have increased knowledge of appropriate responses to girls.

5. One half of the 20 preschool teachers who participate would utilize this knowledge in the classroom most of the time.

Measurement of Outcomes

For objective one the writer designed a pre- and post-questionnaire for the first three workshops that measured the use of appropriate language. (see Appendix B, question 6). For objective two the writer incorporated questions in the pre- and post-questionnaire on the use of gender appropriate techniques for teaching to be measured by questions 1 and 7. For objective three the writer integrated questions in the pre- and post-questionnaire on the use of activities that enhance the confidence of girls to be measured by questions 1, 2, and 3. For objective four the writer employed questions in the pre-and post-questionnaire on the use of appropriate responses to girls and boys to be measured by questions 1, 2, and 3. For objective five the writer asked each teacher to incorporate one activity into her lesson plan that month that will meet the four previous objectives to be measured by the activity evaluation form (see Appendix F).

The lesson plan, the implementation of the activity, and the teacher's evaluation of its outcome was shared at the follow-up workshop through discussion of the answers on the activity evaluation form. The writer also designed a

follow-up questionnaire that measured teachers' utilization of the knowledge of gender equity in the classroom (see Appendix C). Objective one, use of appropriate language, was measured by question 1. Objective two, the use of gender appropriate techniques for teaching, was measured by questions 2, 3, 6, 7, 8, 9, and 10. Objective three, the use of activities that enhance the confidence of girls, was measured by questions 3, 4, 5, 6, 8, 9, and 10. Objective four, the use of appropriate responses to girls and boys, was measured by questions 1, 4, 5, 8, and 9. Objective five, was measured by responses to the questions in the activity evaluation form (see Appendix F).

. The results of the answers to this follow-up questionnaire were shared at the follow-up workshop.

CHAPTER IV

Solution Strategy

Discussion and Evaluation of Possible Solutions

Cheek (1984) proposes that, although it is difficult to change a person's belief system, there are workshops that can institute such changes. Hearne (1986) also cites a variety of workshops and programs that will change the perceptions of teachers. Jacobs (1984) poses the creation of a networking entity that would provide programs for schools in gender equity. Cuevas (1984) suggests the evaluation of instructional materials to determine that the representation of women is not distorted or excluded. Marchand (1990) advocates that teachers become aware of their own math anxiety and negative feelings. Grady (1980) introduced a variety of awareness activities suitable for use with teachers.

Sprung (1975) wrote a checklist for a non-sexist preschool classroom as an instrument to measure gender equity in the classroom. Hearne (1986) and Shapiro (1990) promote providing games, toys, activities, and events for girls that are usually considered for boys. Abel (1983) believes that activities that improve spatial-verbalization skills should be available for girls at an early age.

Kreinburg (1976) and Luchins & Luchins (1980) called for early exposure to role models. Fauth & Jacobs (1980) believed teachers must capitalize on the enthusiasm of girls toward mathematics at a very early age. Derman-Sparks, et al. (1989) suggested developing a curriculum that would incorporate gender equity. They also proposed reorganizing the play equipment to provide access to a variety of toys and play activities that eliminate gender stereotypes. Rosenberg (1992) described a gender-equal environment at her school that allows for development that is child-centered based on the child's needs and interests at that moment.

Silverman-Dresner (1992) advocated providing role models for young children by bringing in women in non-traditional trades and professions to present programs. She also suggested incorporating toys and books that relate to non-traditional careers, such as tool boxes, which she said girls consider "Daddy's tools" by age 3.

Other ideas were generated such as incorporating career projects into the curriculum that reflect females in mathematics-related careers. A job fair can be held using mothers or other women in the community who work in mathematics related fields. Activities can be instituted as part of staff training that provide exercises in gender awareness. An informational packet can be distributed that includes a variety of checklists on toys, games, activities, language, and literature.

Description and Justification for Selected Solution

A training program for preschool teachers that enhanced awareness and provided tangible solutions to the problem was a feasible solution to resolve the problem. A series of workshops based on the training program was provided to preschool teachers. A set of three workshops, one for each of the three preschool programs targeted, was instituted. A set of three follow-up workshops, one for each of the three preschool programs that attended the first three workshops, was presented.

The solution worked because the writer approached several owner-directors of multi-site preschool programs who were enthusiastic about the issue and agreed that workshops for their staff would be effective. The Consortium for Educational Equity at Rutgers University has been successfully using this form of awareness and activity training in elementary and secondary schools through affirmative action workshops.

The literature has cited this approach as instrumental in enhancing insight into the issue and changing attitudes and behaviors of teachers.

Report of Action Taken

Three one-hour training workshops for 20 preschool teachers in three different schools and three follow-up workshops for these same teachers was developed. The agendas were designed and materials were gathered. Documentation of the issue was prepared as part of the presentation.

Children's books representative of gender equity were selected from the local library. Consultation with several training groups resulted in development of appropriate experiential exercises. Activities for incorporation into the curriculum were also developed.

Contact was made with three preschool directors and one Resource and Referral Agency that was providing a ten month training program for Child Development Associate certificate candidates to set the dates for the first three workshops. Letters were sent to the two directors who accepted and the Resource and Referral Agency to confirm the dates for the first three workshops.

The three workshops were held over a three month time span. Each workshop consisted of an introductory experiential exercise to heighten awareness of gender bias. The pre-test was administered and discussion of the issues flowed from the processing of the answers. Classroom activities were introduced and discussed. A closing exercise on the difficulty of making changes was the culminating activity for this workshop.

Each workshop was evaluated for efficacy, and changes deemed necessary were implemented for the next workshop.

Dates for the follow-up workshops were established. Confirmation letters were sent to the two directors and the Resource and Referral Agency regarding the dates for the follow-up workshops.

The design of the follow-up workshops was completed. These workshops were to be presented over the final three

months to allow each group three months to implement and evaluate at least one of the activities on gender equity.

The follow-up workshops were held for the teachers in preschool number one and the Resource and Referral Agency trainees. Preschool number two was unable to free the teachers for the follow-up workshop due to lack of coverage. However, this preschool program only had three participants and their absence did not significantly alter the results of the evaluation. The follow-up workshop began with the showing of a video on gender equity in the classroom (Dateline, 1992). A discussion of the video and the audience's reaction to the contents followed. Participants then retook the pre- and post-test and discussed the results with reinforcement of the the issues as needed. Each participant reported on the activity they had implemented and described the effect on the children and themselves. The follow-up questionnaire was administered and participants discussed the results.

Letters of thank you were sent to the center directors and the trainer and the director of the Resource and Referral agency.

Any requests for follow-up information generated by the workshops were answered. Evaluations of each of the six workshops were synthesized as a tool for final evaluation of the program. Determination was made on the value of such workshops for preschool teachers, to be incorporated into the writer's job scope.

The workshops were enjoyed by both the participants and the presenter and everyone left each workshop with good feelings about the experience. There was enthusiasm among the participants toward the subject and many appeared enlightened by the information and expressed a new awareness of their own and others' behaviors.

CHAPTER V

RESULTS, DISCUSSION AND RECOMMENDATION

Results

The problem was that many adolescent girls do not choose to study higher mathematics or pursue related careers in science and technology. They tend to follow coursework and careers that society deems appropriate for women and do not follow non-traditional paths. As a result of this lack of mathematical background and training, these girls will be denied access to technological careers, management positions, and equal pay for equal work when they reach womanhood and enter the job market. Girls in today's preschool programs will be competing in the highly technical world of the information and computer age of the twenty-first century. Therefore, it is imperative to address the causative factors that affect future choices girls make at a very early age to reverse the process of loss of self-esteem and self-confidence that occurs at the onset of adolescence.

The causes of this problem were well documented in the literature, articles in national and local newspapers and

magazines, and through interviews with mathematics teachers and guidance counselors. The causes revolved around the attitudes and behaviors of educators towards girls in the classroom. Educators believe the myths that mathematics is not relevant for girls and accept stereotyped ideas about the roles girls play in society. They treat boys and girls differently in the classroom due to unconscious biases and do not encourage girls to excel in mathematics or provide role-models or mentoring for their female students. The literature further documented the fact that early exposure from birth to these subtle biases and attitudes had great impact on the erosion of self-esteem and self-confidence of adolescent girls.

The solution was to introduce a pair of workshops to each of three different groups of preschool teachers. The first workshop dealt with introduction of the issues, the causative factors, self-examination of their own behaviors in the classroom, and activities for the classroom that would address the solution of the problem. The second workshop followed three months later and served as a follow-up discussion of the activities implemented during that time, a restatement of the issues and causative factors, and self-evaluation of the teachers' own attitudes and behaviors. The goal of these workshops was to enable the participating teachers in these three separate preschool programs to increase their knowledge of gender equity and utilize this knowledge in the classroom.

Five objectives were designed to fulfill the goal of this project. Two sets of questionnaires were used as measurement tools, a pre- and post- questionnaire on the issues (see Appendix B) and a follow-up questionnaire used as a self-assessment (see Appendix C). An activity evaluation form was used to process the efficacy of the activity the teacher chose to implement in the classroom (see Appendix D).

Objective 1: One half of the 20 preschool teachers who participated would have increased knowledge of gender-appropriate language. The measurements used were question 6 in the pre- and post-questionnaire, and question 1 in the follow-up questionnaire. Table 3 illustrates the results.

Table 3

Indicators of Increased Knowledge of Gender-appropriate Language

Pre and Post	Pre-Test n=30		Post-Test n=26	
Question	Correct	Incorrect	Correct	Incorrect
Teachers use gender-equal language	18	12	19	7

Follow-up Questionnaire n=28				
Question	Always	Sometimes	Rarely	Never
I use gender correct language	4	17	25	1

Objective 2: One half of the 20 preschool teachers who participate would have increased knowledge of gender appropriate techniques for teaching. The measurements used were questions 1 and 7 in the pre- and post-questionnaire and questions 2,3,6,7,8,9,and 10 in the follow-up questionnaire. The results are illustrated in Table 4.

Table 4

Indicators of Increased Knowledge of Gender-appropriate Techniques for Teaching

Pre and Post	Pre-Test n=30		Post-Test n=26	
Question	Correct	Incorrect	Correct	Incorrect
Teachers use gender-equal language	12	18	23	3
Encourage girls to try building and spatial activities	17	12	25	1

Follow-up Questionnaire n=28				
Question	Always	Sometimes	Rarely	Never
Use of gender-biased literature	4	13	5	2
Adapt gender-biased literature	8	11	3	2
Activities of math and spatial orientation	9	12	5	1
Activities using female role models	5	13	5	5
Encourage problem-solving	9	14	3	1
Help girls find solutions on their own	14	9	4	1
Girls participate equally with boys	20	6	1	0

Objective 3: One half of the 20 preschool teachers who participate would have increased knowledge of activities that enhance the confidence of girls. The measurements used were questions 1,2, and 3 in the pre- and post-

Table 5

Indicators of Increased Knowledge of Activities that Enhance the Confidence of Girls

Pre and Post	Pre-Test n=30		Post-Test n=26	
Question	Correct	Incorrect	Correct	Incorrect
Call on girls less often	12	18	23	3
Praise girls for appearance	20	10	22	4
Boys questions and answers are more interesting	11	19	20	6

Follow-up Questionnaire n=28				
Question	Always	Sometimes	Rarely	Never
Adapt gender-biased literature	6	8	3	2
Praise girls for academic success	13	9	0	1
Respond to girls the same as boys	13	9	1	0
Activities of math and spatial orientation	7	9	5	1
Encourage problem-solving	6	12	3	1
Help girls find	15	6	1	0

Objective 4: One half of the 20 preschool teachers who participated would have increased knowledge of appropriate responses to girls. The measurements used were questions 1,2, and 3 in the pre- and post-questionnaire and questions 1,4,5,8, and 9 in the follow-up questionnaire. Table 6 illustrates the results.

Table 6

Indicators of Increased Knowledge of Appropriate Responses to Girls

Pre and Post	Pre-Test n=30		Post-Test n=26	
Question	Correct	Incorrect	Correct	Incorrect
Call on girls less often	12	18	18	3
Praise girls for appearance	20	10	17	4
Boys'questions and and answers are more interesting	11	19	15	6

Follow-up Questionnaire n=23				
Questions	Always	Sometimes	Rarely	Never
Use gender correct language	4	12	6	1
Praise girls for academic success	13	9	0	1
Respond the same to girls' questions	13	9	1	0
Encourage girls to do problem- solving	6	12	3	1
Help girls find solutions on their own	12	6	4	1

Objective 5: One half of the 20 preschool teachers who participated would utilize this knowledge in the classroom most of the time. The measurment used was the activity evaluation form (see Appendix F). Tables 7 and 8 illustrate the results.

Table 7

Activity Description

Activity Title	Number of Girls	Number of Boys	Ages
Community Helpers	8	10	2-5 yrs Floor
Play	8	6	18 mos-4 yrs
Use of Pictures	14	18	6 mos- 4 yrs
Use of Books	10	11	1-5 yrs
Discussion	5	5	4-6 yrs
Create a Book	8	5	5-6 yrs

Table 8

Reactions of Children

(Based on a scale of 1-5, 5 being most interested)

Activity Title	Reaction of Girls	Reaction of Boys
Community Helpers	3	5
Floor Play	3	5
Use of Pictures	6	4
Use of Books	5	4
Discussion	4	4
Create a Book	3	3

Discussion

Initially, the plan was to present the workshops in three preschool programs. However, one preschool director was unable to find two one and a half hour blocks of time to train teachers. When I consulted the director of the county resource and referral agency about other schools, she suggested that the workshop be presented to the Child Development Associate candidates who were currently being trained at her facility. The resulting number of participants therefore, was 23 at this facility, five at one preschool, and 3 at another school. The latter did not complete the training because of coverage problems.

Two questionnaires, one that measured knowledge and understanding of the issues and one that measured self-perceived behavior and attitude (see Appendices B and C) were used as instruments to numerically determine the success of the training program. Tables 3,4,5, and 6 show a marked change in knowledge and understanding of the issues, which well exceeded the expected 50 percent.

Tables 3,4,5, and 6 also demonstrate a change in the awareness of the participants' own behaviors and attitudes as noted by the high number of responses in the always and sometimes columns, as opposed to the low numbers in the rarely and never columns.

The third measurement tool was an evaluation of the activity the participant chose to implement in her classroom over the three months between workshops. There were many varied age groups among the students of the 23 Child Development Associates candidates which accounted for the small number of returns. Many teachers were unable to implement the activities successfully with infants. The best results were with older children between three and six years of age.

The five teachers in the one preschool that participated in both trainings were very enthusiastic about using the activities and many combined a number of activities. For example, one teacher used pictures, books, and flannel board activities to enhance a discussion of role stereotyping. Another teacher did a month-long program on community helpers, emphasizing non-traditional roles such as female fire fighters.

However, even the teachers and caretakers of infants indicated in the follow-up questionnaire that they had experienced a change in attitude and were more aware of their behaviors with the children.

Based upon the positive results of the practicum the writer feels the workshops are a positive step toward achieving equity for girls in preschool and setting the stage for positive self-esteem and self-confidence in adolescence.

Recommendations

It is recommended that these workshops continue to be presented to preschool teachers either on-site at their centers, through training at resource and referral agencies, or at child care conferences. However, the workshop should be adapted to the age of the children since infants and toddlers cannot participate in the same level of activities as older children. Caregivers of these very young children would benefit from awareness exercises and an understanding of the issues and behaviors. This would permit them to provide gender-equal treatment for the girls and boys in their care. The program should also be expanded for school-age child care programs where many of the activities would be appropriate for this age group of 6-13 years old.

Dissemination

A workshop based on this practicum was presented to a group of Child Development Associate candidates in the northern part of the state at the request of the trainer after she heard about the program. It was very well received by this group of preschool teachers.

Another workshop was given at the Statewide School-Age Child Care Coalition Conference in March, 1993. This workshop was presented to 60 people and was expanded to two hours and also included gender equity as it relates to the

socialization of children and the resulting violence in our society.

A paper on this practicum was presented in June 1992 at the First International Conference on Girls and Girlhood, Alice in Wonderland, at Vrije University in Amsterdam, The Netherlands. The paper was well-received by the 40 attendees at this particular workshop on the global view of gender-equity.

The writer will also present this workshop at the National Association for the Education of Young Children Conference in Anaheim, California in November of this year.

The writer has also developed a portion of this practicum for publication. Although it was turned down by one journal for lack of empirical research, the editors did recommend another journal they felt might be interested. The writer will follow up on this over the summer.

The Consortium on Educational Equity at Rutgers University has expressed interest in this practicum as an addition to its existing training programs on gender equity in the public school.

Since managing programs in gender equity is part of the job description of the writer, she will continue to present on this topic at various conferences and programs.

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APPENDIX A

SURVEY OF MATHEMATICS TEACHERS AND GUIDANCE COUNSELORS IN SECONDARY SCHOOL SETTINGS

SURVEY OF MATHEMATICS TEACHERS AND GUIDANCE COUNSELORS IN SECONDARY SCHOOL SETTINGS

1. How many students are in your grade level?
2. How many girls are within this group?
3. How many girls in your school continue to study higher mathematics?
4. How many girls pursue careers that are math-related?
5. What do you perceive as a reason for this problem if it exists in your school?

APPENDIX B

PRE- AND POST-QUESTIONNAIRE

PRE- AND POST-QUESTIONNAIRE

After the onset of adolescence, most girls do not continue to study higher mathematics.

The following statements are thought to be causes of this problem. Please answer true or false to the following questions:

T/F	STATEMENT
	1. Teachers call on girls less often than boys.
	2. Teachers praise girls for appearance, boys for success.
	3. Teachers think boys' questions and answers are more interesting than girls'.
	4. Girls are not encouraged to study mathematics and science.
	5. Children's picture books and posters show girls doing activities that are the same as boys.
	6. Teachers use gender-equal language.
	7. Teachers encourage girls to try activities that involve building and spatial activities.
	8. People believe that mathematics is a male domain.
	9. There are very few role models in math and science for girls to follow.
	10. Gender equity begins at birth.

APPENDIX C

FOLLOW-UP QUESTIONNAIRE

FOLLOW-UP QUESTIONNAIRE

Gender Equity Applications in the School Setting

Please check the appropriate column based on your application of the material learned in the workshop.

Key: 4 = Always, 3 = Sometimes, 2 = Rarely, 1 = Never

Question	4	3	2	1
1. I use gender correct language.....				
2. I avoid using gender-biased literature.....				
3. When faced with gender-biased literature I adapt or explain the pictures and language in appropriate terms.....				
4. I praise girls for academic success.....				
5. I respond to girls' questions the same way as boys' questions.....				
6. I encourage girls to do activities that are mathematically and spatially oriented.....				
7. I provide activities using female role models in mathematics and technology through parent visits, pictures, and stories.....				
8. I encourage girls to do problem-solving activities...				
9. I help girls find solutions on their own, not just give them the answers.....				
10. I call on girls to participate equally with boys.....				

COMMENTS: _____

APPENDIX D

WORKSHOP AGENDA

WORKSHOP AGENDA

I. Introduction of facilitator, topic, and purpose of the workshop.

II. Introduction of participants through experiential exercise.

III. First completion of the pre- and post-workshop questionnaire on gender equity.

IV. Experiential exercise utilizing role playing techniques to internalize inequity in the classroom.

V. Discussion of topic of gender equity in mathematics and its relationship to preschool education, including question and answer period.

VI. Discussion of activities that can be incorporated into preschool programs.

VII. Choice of activity teacher will use in lesson plan over the next month.

VIII. Explanation of the use of the activity evaluation form which will measure use of the activity in the classroom.

IX. Discussion of follow-up workshop to be held two months later.

X. Closing experiential exercise.

APPENDIX E

AGENDA FOR FOLLOW-UP WORKSHOP

AGENDA FOR FOLLOW-UP WORKSHOP

I. View video DATELINE USA on gender equity in the classroom and discussion of video.

II. Completion of pre- and post-questionnaire.

III. Discussion of results compared to the first workshop.

IV. Presentation by each teacher of the activity chosen, the implementation of that activity, and the results.

V. Feedback from the group on ideas and suggestions for enhancement of activities used during the previous month.

VI. General discussion of ideas for further gender-equal activities, programs, and materials.

VII. Completion of follow-up questionnaire.

VIII. Scoring of questionnaire and discussion of results.

IX. Finish with experiential exercise to reinforce attitudes and beliefs on gender equity in the classroom.

APPENDIX F

ACTIVITY EVALUATION FORM

ACTIVITY EVALUATION FORM

NAME OF ACTIVITY_____

_____

NUMBER OF CHILDREN_____GIRLS_____BOYS_____

AGE GROUP_____

DATE IMPLEMENTED_____

BRIEFLY DESCRIBE THE ACTIVITY_____

_____

_____

MATERIALS USED_____

ON A SCALE OF 1-5 PLEASE RATE THE REACTIONS OF THE CHILDREN WITH 5 BEING MOST INTERESTED AND 1 BEING LEAST INTERESTED:

1.....2.....3.....4.....5

GIRLS _____

BOYS _____

PLEASE COMMENT ON YOUR REACTIONS TO THE ACTIVITY:

_____

_____

_____

_____

_____

_____

_____

Thank you for your participation in this program. Your input into gender equity in the classroom will benefit your students in the future.

APPENDIX G

WORKSHOP OUTLINE: LARGE GROUP

WORKSHOP OUTLINE: Large Group

INTRODUCTION: Brainstorm definition of stereotype and post on newsprint. Add dictionary definition and common definition (5 minutes).

Definition of Stereotype: a conventional or standardized conception or image; to make a stereotype of (Websters Desk Dictionary of the English Language, 1990).

Common definition: assigning traits and characteristics, usually negative, to a group.

EXPERIENTIAL ACTIVITY: Divide into small groups of 5-6 members by counting off. Give each group newsprint and a marker and an index card marked girl, boy, man, woman. Ask them to brainstorm and list characteristics of the human named on the index card. Hang up around the room (8 minutes). Debriefing: ask one person from each group to read the list and ask everyone if these are stereotypes based on the definitions. Use examples that occur everyday in classrooms, i.e. boys are noisy and aggressive or men/boys don't cry (7 minutes).

COMPLETE PRE-WORKSHOP QUESTIONNAIRE: Discussion of results (5 minutes).

DISCUSSION OF ISSUE: Presentation on issue of gender equity in mathematics with question and answer period. (20 minutes).

PRESENTATION OF ACTIVITIES FOR THE CLASSROOM: (see Appendix I) (15 minutes).

ADDITIONAL ACTIVITIES: If time permits one of the following closing activities will be used:

1. Ask the group to silently regroup by similarities into groups of three, then groups of six, then groups of 12. Debrief by discussing how people felt if they were excluded and included. (20 minutes).
2. Divide the large group again into the groups of 5-6 and ask each person to change five things of their physical appearance, then 10 things. They may help each other and exchange items. Debrief by discussing how it is harder to change 10 things than five. Talk about change in education and the difficulty of making this change (20 minutes).

APPENDIX H

WORKSHOP OUTLINE: SMALL GROUP

WORKSHOP OUTLINE: Small Group

INTRODUCTION: Brainstorm definition of stereotype and post on newsprint. Add dictionary definition and common definition (See Appendix G), (5 minutes).

EXPERIENTIAL ACTIVITY: Using the entire group or groups of five, depending upon the number of participants, ask each person to change five things of their physical appearance, then 10 things. They may help each other and exchange items. Debrief by discussing how it is harder to change 10 things than five. Talk about change in education and the difficulty of making this change (20 minutes).

COMPLETE PRE-WORKSHOP QUESTIONNAIRE: Discussion of results (5 minutes).

DISCUSSION OF ISSUE: Presentation on issue of gender equity in mathematics with question and answer period. (20 minutes).

PRESENTATION OF ACTIVITIES FOR THE CLASSROOM: (See Appendix I) (15 minutes).

ADDITIONAL ACTIVITY: If time permits the following closing activity will be used: Participants will be asked to identify and list on newsprint unconscious well-intended behaviors (UWIB) that exist in the classroom. For example: I need three strong *boys* to move these tables. Debrief through discussion of the UWIB statements (7-10 minutes).

APPENDIX I

ACTIVITIES TO IMPLEMENT IN THE CLASSROOM

ACTIVITIES TO IMPLEMENT IN THE CLASSROOM

1. Hang pictures around the room to illustrate non-traditional or math/science related careers in which women work. Discuss these jobs and the people who work in them.

2. Bring in mothers or women in the community who work in non-traditional or math/science related jobs to talk about their job, why they like it, and why they chose to do this kind of work.

3. Read three books on women in non-traditional or math/science careers and discuss the reasons they work in these jobs and how they enjoy doing this kind of work.

4. Read three books on family life that portray mothers as working and fathers as performing household and nurturing tasks.

5. Hang up pictures around the room of men and women doing different things at home and at work that break the stereotype.

6. Have the children make a picture book on women in different kinds of jobs and have the children write a 'story' about each picture. Leave it for the children to look at during the day and read it to them on a regular basis.

7. Have the children make a picture book on the family illustrating mothers and fathers in different roles in the home and at work and have the children write a 'story' about each picture. Leave it for the children

to look at during the day, and read it regularly.

8. Write a story together "when I grow up I want to be" and have the children illustrate the story. Encourage females portrayed in non-traditional and math/science jobs. This activity can be done either as a book or as a mural.

.....

Additional Activities: Observe the layout of your room and the materials and toys available. Are they non-sexist and made available for all the children? Are all the children encouraged everyday to play together in each area regardless of gender? Are girls encouraged to participate in the climbing and large motor activities outdoors along with the boys? Are girls encouraged to use three dimensional activities such as blocks and trucks to increase spatial ability? Are boys provided with boy size dress up clothes and encouraged to play in the house area? Finally, be aware of your own *unconscious, well-intended behaviors* towards boys and girls. Do you really need three strong *boys* to move this table, or can three strong *children* also do it? Does Jennifer always look *pretty* and Jason act *clever*? Are the words *he* and other general male references a regular part of the classroom vocabulary, or does *she, her, and person* also get their fair share of usage? Do you call on the girls as often as the boys and encourage them to solve problems themselves?

Appendix J

FOLLOW-UP WORKSHOP OUTLINE

Follow-up Workshop Outline

INTRODUCTORY ACTIVITY: Participants will view video on gender equity in the classroom (Dateline, 1992) and discuss what they have seen (10 minutes).

COMPLETE POST-WORKSHOP QUESTIONNAIRE: discussion of results and review of issues (See Appendix B), (10 minutes).

PRESENTATION OF ACTIVITY RESULTS: Each teacher will describe the activity chosen, the implementation of that activity, and the results of the implementation. **Each participant will describe how she felt about using the assigned activities in the classroom** (See Appendix J). The group will give feedback on other ideas and suggestions for enhancement of the activities Participants will complete follow-up questionnaire (30 minutes).

EXPERIENTIAL ACTIVITY: Facilitator will choose four people from the audience and assign a persona to each, i.e. boy or girl. Facilitator will then conduct a discussion on a simple topic such as turtles using these four panelists. The audience will be asked to code gender inequities in the discussion and discuss them afterward. (20 minutes).